

WHAT IS CLAIMED IS:

1 1. A wireless communication device capable of downloading a
2 software update file from a wireless network, said wireless
3 communication device comprising:
4 a non-volatile memory capable of being re-programmed by
5 sectors, wherein said non-volatile memory stores: 1) a target file
6 to be updated, 2) said downloaded software update file, and 3) a
7 journal comprising a plurality of entries, each of said plurality
8 of entries containing status information associated with a re-
9 programmed sector of said non-volatile memory;
10 a random access memory; and
11 a main processor capable of replacing target code in said
12 target file with replacement code from said downloaded software
13 update file, wherein said main processor creates a first block of
14 replacement code in said random access memory and re-programs a
15 first target sector of said non-volatile memory by storing said
16 first block of replacement code into said first target sector, and
17 wherein said main processor updates first status information in a
18 first entry in said journal associated with said first target
19 sector.

1 2. The wireless communication device as set forth in Claim 1
2 wherein said first status information comprises a first parameter
3 indicating that said first block of replacement code was
4 successfully stored in said first target sector.

1 3. The wireless communication device as set forth in Claim 2
2 wherein said main processor is further capable of storing first
3 target code from said first target sector in a save-area of said
4 non-volatile memory prior to storing said first block of
5 replacement code into said first target sector.

1 4. The wireless communication device as set forth in Claim 3
2 wherein said first status information comprises a second parameter
3 indicating that said first target code from said first target
4 sector was successfully stored in said save-area of said non-
5 volatile memory.

1 5. The wireless communication device as set forth in Claim 4
2 wherein said main processor is further capable of storing said
3 first target code from said save-area back into said first target
4 sector after a power loss in said mobile station.

1 6. The wireless communication device as set forth in Claim 5
2 wherein said first block of replacement code in said random access
3 memory is equivalent in size to a sector of said non-volatile
4 memory.

1 7. The wireless communication device as set forth in Claim 6
2 wherein said main processor, after said wireless communication
3 device is restarted after a power loss, uses status information
4 stored in said journal to identify a last successfully re-
5 programmed sector in said non-volatile memory.

1 8. The wireless communication device as set forth in Claim 7
2 wherein said main processor resumes replacing target code in said
3 target file with replacement code from said downloaded software
4 update file by re-programming a next sequential sector in said non-
5 volatile memory following said last successfully re-programmed
6 sector.

1 9. The wireless communication device as set forth in Claim 8
2 wherein said journal is stored in at least a first journal sector
3 and a second journal sector of said non-volatile memory.

1 10. The wireless communication device as set forth in Claim 9
2 wherein said main processor, in response to a determination that
3 said first journal sector is full of journal entries, erases said
4 second journal sector and stores a next journal entry in said
5 second journal sector.

1 11. A method of upgrading software in a wireless
2 communication device capable of downloading a software update file
3 from a wireless network, the wireless communication device
4 comprising a non-volatile memory that is re-programmed by sectors
5 and stores: 1) a target file to be updated, 2) the downloaded
6 software update file, and 3) a journal comprising a plurality of
7 entries, each of the plurality of entries containing status
8 information associated with a re-programmed sector of the non-
9 volatile memory, the method of upgrading software comprising the
10 steps of:

11 creating a first block of replacement code in a random
12 access memory of the wireless communication device using
13 replacement code from the downloaded software update file;

14 re-programming a first target sector of the non-volatile
15 memory by storing the first block of replacement code into the
16 first target sector; and

17 updating first status information in a first entry in the
18 journal associated with the first target sector.

1 12. The method as set forth in Claim 11 wherein the first
2 status information comprises a first parameter indicating that the
3 first block of replacement code was successfully stored in the
4 first target sector.

1 13. The method as set forth in Claim 12 further comprising
2 the step of storing first target code from the first target sector
3 in a save-area of the non-volatile memory prior to storing the
4 first block of replacement code into the first target sector.

1 14. The method as set forth in Claim 13 wherein the first
2 status information comprises a second parameter indicating that the
3 first target code from the first target sector was successfully
4 stored in the save-area of the non-volatile memory.

1 15. The method as set forth in Claim 14 further comprising
2 the step of storing the first target code from the save-area back
3 into the first target sector after a power loss in the mobile
4 station.

1 16. The method as set forth in Claim 15 wherein the first
2 block of replacement code in the random access memory is equivalent
3 in size to a sector of the non-volatile memory.

1 17. The method as set forth in Claim 16 further comprising
2 the step, after the wireless communication device is restarted
3 after a power loss, if using status information stored in the
4 journal to identify a last successfully re-programmed sector in the
5 non-volatile memory.

1 18. The method as set forth in Claim 17 further comprising
2 the step of resuming replacing target code in the target file with
3 replacement code from the downloaded software update file by re-
4 programming a next sequential sector in the non-volatile memory
5 following the last successfully re-programmed sector.

1 19. The method as set forth in Claim 18 wherein the journal
2 is stored in at least a first journal sector and a second journal
3 sector of the non-volatile memory.

1 20. The method as set forth in Claim 19 further comprising
2 the steps, in response to a determination that the first journal
3 sector is full of journal entries, of erasing the second journal
4 sector and storing a next journal entry in the second journal
5 sector.

1 21. A wireless communication device capable of receiving an
2 incoming software update file transmitted by a wireless network,
3 said wireless communication device comprising:
4 a non-volatile memory capable of being re-programmed by
5 sectors, wherein said non-volatile memory stores: 1) a downloaded
6 software update file, and 2) a journal comprising a plurality of
7 entries, each of said plurality of entries containing status
8 information associated with a re-programmed sector of said non-
9 volatile memory;
10 a random access memory; and
11 a main processor capable of storing replacement code from
12 said incoming software update file in said downloaded software
13 update file, wherein said main processor stores a first block of
14 replacement code from said incoming software update file in said
15 random access memory and re-programs a first target sector of said
16 downloaded software update file in said non-volatile memory by
17 storing said first block of replacement code into said first target
18 sector, and wherein said main processor updates first status
19 information in a first entry in said journal associated with said
20 first target sector.

1 22. The wireless communication device as set forth in Claim
2 21 wherein said first status information comprises a first
3 parameter indicating that said first block of replacement code was
4 successfully stored in said first target sector.

1 23. The wireless communication device as set forth in Claim
2 22 wherein said main processor is further capable of storing first
3 target code from said first target sector in a save-area of said
4 non-volatile memory prior to storing said first block of
5 replacement code into said first target sector.

1 24. The wireless communication device as set forth in Claim
2 23 wherein said first status information comprises a second
3 parameter indicating that said first target code from said first
4 target sector was successfully stored in said save-area of said
5 non-volatile memory.

1 25. The wireless communication device as set forth in Claim
2 24 wherein the main processor is further capable of storing the
3 first target code from the save-area back into the first target
4 sector after a power loss in the mobile station.

1 26. A method of downloading software in a wireless
2 communication device capable of receiving an incoming software
3 update file transmitted by a wireless network, the wireless
4 communication device comprising a non-volatile memory that is re-
5 programmed by sectors and stores: 1) a downloaded software update
6 file, and 2) a journal comprising a plurality of entries, each of
7 the plurality of entries containing status information associated
8 with a re-programmed sector of the non-volatile memory, the method
9 of upgrading software comprising the steps of:

10 storing a first block of replacement code from the
11 incoming software update file in the random access memory;

12 re-programming a first target sector of the downloaded
13 software update file in the non-volatile memory by storing the
14 first block of replacement code into the first target sector; and

15 updating first status information in a first entry in the
16 journal associated with the first target sector.

1 27. The method as set forth in Claim 26 wherein the first
2 status information comprises a first parameter indicating that the
3 first block of replacement code was successfully stored in the
4 first target sector.

1 28. The method as set forth in Claim 27 further comprising
2 the step of storing first target code from the first target sector
3 in a save-area of the non-volatile memory prior to storing the
4 first block of replacement code into the first target sector.

1 29. The method as set forth in Claim 28 wherein the first
2 status information comprises a second parameter indicating that the
3 first target code from the first target sector was successfully
4 stored in the save-area of the non-volatile memory.

1 30. The method as set forth in Claim 29 further comprising
2 the step of storing the first target code from the save-area back
3 into the first target sector after a power loss in the mobile
4 station.